

The Lemelson-MIT Program Overview

One of America's most prolific inventors, Jerome H. Lemelson (1923-1997), and his wife, Dorothy, established the Lemelson-MIT Program at the Massachusetts Institute of Technology in 1994. Administered by MIT's School of Engineering, the program recognizes outstanding inventors, encourages sustainable new solutions to real-world problems, and enables and inspires young people to pursue creative lives and careers through invention.

Awards and Grants

The **\$500,000 Lemelson-MIT Prize** honors outstanding mid-career inventors who have developed a patented product or process of significant value to society, which could be or has been adopted for practical use.

The **\$100,000 Lemelson-MIT Award for Sustainability** celebrates inventors whose innovations enhance economic opportunity and community well-being in developing and/or developed countries, while protecting and restoring the natural environment.

The **\$30,000 Lemelson-MIT Student Prize** recognizes MIT seniors or graduate students who demonstrate remarkable inventiveness.

Lemelson-MIT InvenTeams is a national grants initiative to inspire a new generation of inventors by awarding up to \$10,000 each to teams of high school students, teachers, and mentors to develop an invention that addresses a problem they have identified. web.mit.edu/inventeams/

Funded Partners

Student Prizes: The Lemelson-MIT Program funds two additional student prizes that recognize outstanding students who demonstrate remarkable inventiveness: the **\$30,000 Lemelson-Rensselaer Student Prize** at the Rensselaer Polytechnic Institute and the **\$30,000 Lemelson-Illinois Student Prize** at the University of Illinois at Urbana-Champaign.

MIT IDEAS Competition: This competition provides seed money and support for teams to develop and implement innovations that make positive changes in the world. The Lemelson-MIT Program sponsors \$10,000 in awards for technology projects that benefit communities in developing countries.

2.009 Product Engineering Processes: In this MIT course, students work in large teams to build working alpha prototypes of new products they have designed. The Lemelson-MIT Program provides funds for team project budgets and resources for students to participate in hands-on learning experiences.

International Development Initiative (IDI): IDI creates opportunities to improve lives in developing regions through its collaborative design approach, which enables MIT faculty and students to share their technical expertise, skills, and problem-solving abilities with under-served communities. The Lemelson-MIT Program supports international development classes (D-Lab) and associated field trips.

Public Education, Awareness, and Outreach

- ***EurekaFest***
A multi-day celebration designed to empower a legacy of inventors through activities that inspire youth, honor role models, and encourage creativity and problem solving; presented in partnership with the Museum of Science, Boston, and other collaborators
- ***Lemelson-MIT Program Web site, web.mit.edu/invent/***
A comprehensive online clearinghouse for information about inventors and resources on invention, featuring the Invention Dimension segment that includes the *Inventor of the Week* profiles of inventors' lives and the *Inventor's Handbook*, a guide to the invention process
- ***Inventory***
A biannual newsletter that features award winners and highlights activities and upcoming opportunities for the inventive community
- ***INVENTION: Enhancing inventiveness for quality of life, competitiveness, and sustainability***
A report by the Committee for Study of Invention, also sponsored by the National Science Foundation
- ***Inventing Modern America: From the Microwave to the Mouse***
A book that profiles the life and work of 35 American inventors who helped shape the modern world (www.inventingmodernamerica.com/)

The Lemelson Foundation (www.lemelson.org/), a private philanthropy that celebrates and supports inventors and entrepreneurs in order to strengthen social and economic life in the United States and developing countries, funds the Lemelson-MIT Program. For more information, please visit web.mit.edu/invent/ or call (617) 253-3352.

Lemelson-MIT Awards Frequently Asked Questions

1. Who established the Lemelson-MIT Program?

Jerome H. Lemelson (1923-1997), and his wife, Dorothy, established the Lemelson-MIT Program to recognize and reward outstanding inventors and innovators in the hope of encouraging more young people to pursue careers in science, engineering, technology, and entrepreneurship.

2. Who funds the program?

The Lemelson Foundation funds the program, which is administered by MIT.

3. What is the Lemelson-MIT Program's mission?

The Lemelson-MIT Program recognizes outstanding inventors, encourages sustainable new solutions to real-world problems, and enables and inspires young people to pursue creative lives and careers through invention.

4. How many Lemelson-MIT Awards are there?

There are two annual national awards. The *\$500,000 Lemelson-MIT Prize* is presented to an individual (or two collaborators), who is dedicated to improving our world through technological invention and innovation. The *\$100,000 Lemelson-MIT Award for Sustainability* is presented to an individual (or two collaborators) whose inventions enhance economic opportunities and societal well-being in developing and/or developed countries, while protecting and restoring the natural environment. Each year, the program also awards the *\$30,000 Lemelson-MIT Student Prize* to an MIT student for inventiveness and creativity.

5. Who can apply for the awards?

Candidates for the \$500,000 Lemelson-MIT Prize and \$100,000 Lemelson-MIT Award for Sustainability are identified by nomination only. Individuals seeking to be nominated are welcome to approach a relevant professional organization (science, engineering, medical or business) and/or regional inventors' groups to secure and support a nomination. All MIT seniors and graduate students can apply for the \$30,000 Lemelson-MIT Student Prize. The Student Prize is not an engineering prize; students from across the Institute are eligible.

6. Who qualifies as a nominator for the \$500,000 Lemelson-MIT Prize and \$100,000 Lemelson-MIT Award for Sustainability?

Nominators for the national awards are people with experience in engineering, science, medicine, or business. For example, nominators may be inventors, venture capitalists, engineers, or other influential professionals. Nominators may step forward on behalf of a candidate to submit a nomination or the program may identify and contact potential nominators of worthy candidates.

7. What is the nomination process for the \$500,000 Lemelson-MIT Prize and \$100,000 Lemelson-MIT Award for Sustainability?

Nomination cover sheets can be downloaded at web.mit.edu/invent/a-main.html for both awards. Cover sheets and additional information packets can be mailed upon request. Send mail requests to Lemelson-MIT Program Officer, Lemelson_Awards@mit.edu.

8. How can one apply for the \$30,000 Lemelson-MIT Program Student Prize?

Applications for the Student Prize are available through the Lemelson-MIT Program Web site, web.mit.edu/invent/a-student.html.

9. Can nominators nominate two candidates for the same award?

Yes, nominators may nominate more than one candidate for the same award.

10. How long are nominations for the \$500,000 Lemelson-MIT Prize and \$100,000 Lemelson-MIT Award for Sustainability active?

Nominations are active for two years.

11. May candidates be re-nominated in subsequent years?

Yes, candidates may be re-nominated in subsequent years, if they have not previously won that award.

12. Who can nominators contact regarding questions during the application process or to review materials for the \$500,000 Lemelson-MIT Prize and \$100,000 Lemelson-MIT Award for Sustainability?

Nominators may contact Lemelson-MIT Program Officer, Lemelson_Awards@mit.edu, if they have questions about the process or would like their application materials reviewed prior to the deadline.

13. How are the Lemelson-MIT Award winners chosen?

To select winners of the \$500,000 Lemelson-MIT Prize and \$100,000 Lemelson-MIT Award for Sustainability, two independent screening committees comprised of MIT faculty review the nominations and select finalists for each award. A national jury of experts from science, engineering, medicine, technology and business then selects winners from both finalist pools, who must then be ratified by the Lemelson-MIT Prize Board. A judging panel comprised of MIT alumni, including scientists, technologists, engineers, and entrepreneurs, chooses the \$30,000 Lemelson-MIT Student Prize recipient.

14. Does the Lemelson family participate in the selection of the winners?

No, the Lemelson family is the benefactor of the program and does not participate in the selection processes.

15. How will the Lemelson-MIT Award winners be notified?

After final deliberations are made, the winners of the \$500,000 Lemelson-MIT Prize, \$100,000 Lemelson-MIT Award for Sustainability, and \$30,000 Lemelson-MIT Student Prize are each notified by telephone from the Lemelson-MIT Program director.

16. When are the Lemelson-MIT Award winners notified?

The Lemelson-MIT Program director notifies the winners of the \$500,000 Lemelson-MIT Prize and \$100,000 Lemelson-MIT Award for Sustainability in February of the awarding year, and the winner of the \$30,000 Lemelson-MIT Student Prize in January of the awarding year.

17. When will the Lemelson-MIT Award winners be announced?

The winners of the \$500,000 Lemelson-MIT Prize and \$100,000 Lemelson-MIT Award for Sustainability are announced each spring of the awarding year. The winner of the \$30,000 Lemelson-MIT Student Prize is announced during a press conference at MIT in February of the awarding year.

18. Are there requirements about how Lemelson-MIT Award monies must be spent?

There are no requirements as to how Lemelson-MIT Award winners must allocate their award monies. The awards are intended to recognize inventors, sustain inventive communities, and inspire youth to invent. Winners will be invited and encouraged to participate in Lemelson-MIT Program activities, including youth outreach opportunities to inspire young people to pursue creative lives and careers.

19. Are there other Student Prizes?

The Lemelson-MIT Program also funds the \$30,000 Lemelson-Illinois Student Prize and the \$30,000 Lemelson-Rensselaer Student Prize, which are administered by the University of Illinois at Urbana-Champaign and Rensselaer Polytechnic Institute, respectively.

20. What type of grants does the Lemelson-MIT Program offer?

Lemelson-MIT InvenTeams is a national grants initiative that awards up to \$10,000 to teams of high school students, teachers, and mentors to create an invention to solve a problem they have identified. Grants are awarded annually based on inventiveness, ingenuity and feasibility of project proposals. For more information on InvenTeams please visit web.mit.edu/inventeams/.

Merton C. Flemings
Professor and Faculty Director, Lemelson-MIT Program

An inventor and specialist in metallurgy and materials science, Professor Merton C. Flemings has focused his career on how to produce better products through understanding and applying the underlying science of materials.

Flemings developed an interest in metallurgy as a sophomore at MIT. According to Flemings, "It looked like a great hands-on field with a lot of chemistry and physics involved." He received his S.B. degree from MIT in the Department of Metallurgy in 1951, followed by his S.M. and Sc.D. degrees in metallurgy in 1952 and 1954, respectively.

From 1954 to 1956, Flemings was employed as a metallurgist at Abex Corporation in Mahwah, New Jersey, and in 1956 he returned to MIT as assistant professor. He was appointed associate professor in 1961, professor in 1969, Abex Professor of Metallurgy in 1971, Ford Professor of Engineering in 1975, Toyota Professor of Materials Processing in 1981, and Professor, and Toyota Professor of Materials Processing Emeritus, in 2002.

Flemings established the Materials Processing Center at MIT in 1979; he was the director from 1979 to 1982. He served as head of the Department of Materials Science and Engineering from 1982 to 1995 and thereafter returned to serve as a full-time teacher and researcher as Toyota Professor. Flemings was a visiting professor at Cambridge University in 1971, Tokyo University in 1986, and Ecole des Mines de Paris in 1996. From 1999 to 2001 he served as co-director of the Singapore-MIT Alliance, a major distance educational and research collaboration between MIT and two Singaporean universities. He was also chairman of the board of the Silk Road Project, Inc. from 1996 to 2006, a non-profit foundation established to broadly illuminate contributions of the Silk Road to the arts and society and support innovative collaborations among artists of the Silk Road and the west. He is currently faculty director of the Lemelson-MIT Program, which recognizes inventors, encourages sustainable development for real-world problems, and inspires youth to pursue creative lives and careers.

Flemings' research and teaching concentrate on engineering fundamentals of materials processing and innovation of materials processing operations. His first patent was issued in 1965 for "Casting Process and Apparatus for Obtaining Unidirectional Solidification." Two of his most notable inventions are processes widely used in industry. One is the process to use magnetic fields to improve the quality of silicon single crystals and of steel continuous castings. The other process produces and forms metals in the semi-solid state; it is used to produce high-quality lightweight aluminum components for cars. He has worked closely with industry to solve problems, and he currently serves on a number of corporate and technical advisory boards.

Flemings has been active internationally in strengthening the field of materials science and engineering and delineating new directions for it. He is author or co-author of 335 papers and two books in the fields of solidification science and engineering, foundry technology, and materials processing. He has received numerous medals, awards and distinctions and is a member of the National Academy of Engineering and the American Academy of Arts and Sciences. In 2002, two endowed chairs were established in his name at MIT.

Today, Flemings continues to invent—he currently holds 31 co-authored patents. Flemings advises aspiring inventors to "keep focused, work hard, don't get discouraged, and have fun."

PAST RECIPIENTS OF THE \$500,000 LEMELSON-MIT PRIZE

Timothy M. Swager, 2007

Building on his knowledge of organic chemistry, Timothy Swager designs molecules with novel functions and applies them in the real world. Through advancements in molecular wires, Swager has invented a new class of highly sensitive materials, which are employed in explosives detection and have potential applications in healthcare, environmental protection, and security. His other inventions include lasing sensors that have potential to deliver improved sensitivity, low-dielectric constant polymers for electronics, and near-infrared optical imaging agents that could aid in the diagnosis of Alzheimer's disease.

James Fergason, 2006

James Fergason has immersed himself in the study of liquid crystals, from developing practical uses for cholesteric liquid crystals to applying the twisted nematic field effect of liquid crystals for use in the flat panel display industry. Fergason started International Liquid Crystal Company (Ilixco), followed by Fergason Patent Properties LLC to commercialize and further opportunities with his inventions. He has invented many applications for LCDs such as surface mode LCDs, polymer dispersed liquid crystals (PDLC), head mounted displays (HMD), and eye protection technology. Fergason holds 130 U.S. and 500 foreign patents.

Elwood "Woody" Norris, 2005

Independent inventor Elwood "Woody" Norris' fascination and prior work with sound led him to create HyperSonic Sound (HSS®), a device that mixes sound frequencies to create crisp, clean sound that can be directed like a laser beam. Norris also developed AirScooter®, an ultra-light, easy to operate personal flying craft. He holds 47 patents, with others pending, for inventions including a transcutaneous Doppler system and an ear-mounted speaker/microphone device. In 2005, Norris started a foundation to aid struggling independent inventors.

Nick Holonyak, Jr., 2004

Nick Holonyak, Jr. invented the first practical red LED (light emitting diode) in 1962, an efficient and durable energy source with ever-evolving applications. Collaborating often with others, Holonyak also developed the first visible-spectrum semiconductor laser, the household dimmer switch, and the first quantum well semiconductor laser. His work, most of which resided at the University of Illinois where he has mentored 60 graduate students, has had a profound influence on the lighting industry, global communications and consumer products.

Leroy E. Hood, 2003

A visionary who changed the course of biology by inventing new tools, Leroy Hood has helped unravel the mysteries of human biology. His automated DNA sequencer facilitated the Human Genome Project—to decipher the code of human DNA. Hood's other core instruments, which have impacted medicine and research, include the protein sequencer, protein synthesizer and DNA synthesizer. Hood is co-founder of the Institute for Systems Biology, which focuses on analyzing all the elements of a system at once.

Dean Kamen, 2002

Committed to enhancing human capabilities through technology, inventor and entrepreneur Dean Kamen holds more than 150 patents, mostly for medical devices. Among them are the stair-

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climbing Independence™ IBOT™ Mobility System; a wearable infusion pump; a portable dialysis machine; and an improved flexible stent. In 2001, Kamen unveiled the Segway™ Human Transporter (HT)—an electric powered personal transportation machine that moves by shifts in one's body weight. He established For Inspiration and Recognition of Science and Technology (FIRST) in 1989 to inspire young people to pursue opportunities in science and engineering.

Raymond C. Kurzweil, 2001

Futurist Raymond Kurzweil's wide-ranging inventions include the first reading machine for the blind; the first text-to-speech synthesizer; the first musical synthesizer capable of reproducing the grand piano and other orchestral instruments; and the first commercially marketed large vocabulary speech recognition system. He has written extensively about the future of computing and artificial intelligence, which recently includes *The Singularity is Near* (Viking Adult, 2005).

Thomas J. Fogarty, 2000

Thomas Fogarty, a surgeon, inventor and entrepreneur, invented medical devices that have saved millions of lives and limbs. He also developed innovative clinical procedures; founded important medical device firms; and trained countless young surgeons, engineers and scientists. His hallmark invention, the embolectomy balloon catheter, makes it possible for doctors to remove blood clots without major surgery.

Carver A. Mead, 1999

Physicist Carver Mead revolutionized the semiconductor industry with his pioneering application of computer automation to create very-large-scale integrated (VLSI) circuits. His design eventually was adopted among all semiconductor companies and resulted in a variety of new microchips. Mead also laid the foundation for the Information Age with his gallium-arsenide transistor (invented in the 1960s), which evolved into HEMT—the universal amplifying device in microwave receivers, used in myriad telecommunication systems.

Robert S. Langer, 1998

A trailblazer in biomaterials based on polymer research, Robert Langer's innovations in tissue engineering include vaccines, tissue repair, diagnostics, novel therapeutics, and controlled-release drugs such as Gliadel®, a treatment for brain cancer. In 1999, Langer invented the implantable silicon chip known as the pharmacy on a chip—another method of controlled drug delivery. In 2002, he created biorubber, a polymer with elasticity for constructing artificial organs.

Douglas C. Engelbart, 1997

Technological visionary Douglas Engelbart has dedicated his career to designing systems that can help humans collectively manage their increasingly complex world. He holds 20 patents and is best known as the creator of the computer mouse. Founder and Director of the Bootstrap Institute, he also is credited with developing collaborative computing, multiple screen-sharing applications, cross-file editing, hypermedia and community networking systems.

Herbert W. Boyer and Stanley N. Cohen, 1996

Medical researchers Herbert Boyer and Stanley Cohen developed the basic science underlying genetic engineering after succeeding in splicing a piece of foreign DNA into a plasmid carrier. In the process, they transformed biomedical research, launched the multi-million dollar biotechnology industry, opened the way for gene therapy, and initiated a profound change in the way pharmaceuticals and agricultural products are developed and produced.

William J. Bolander, 1995

Automotive engineer William Bolander's inventions have been instrumental in keeping the American automotive industry on the cutting edge. He holds 16 U.S. patents including several in the field of combustion knock control. With innovations like Saturn's traction control system and Cadillac Northstar's limp-home technology, Bolander helped improve passenger safety and automotive performance.

PAST RECIPIENTS OF THE LEMELSON-MIT LIFETIME ACHIEVEMENT AWARD

Dr. Sidney Pestka, 2006

Also known as the “father of interferon” for his groundbreaking work developing antiviral treatments for chronic hepatitis B and C, multiple sclerosis and cancers, Sidney Pestka holds 270 U.S. and foreign patents, of which many have broad applications in the biotechnology and pharmaceutical industries. Pestka was the first to purify interferon alpha and beta; to develop reverse phase high-performance liquid chromatography (RPHPLC) for protein purification; to genetically engineer interferons; and to manufacture interferons for human therapy.

Robert H. Dennard, 2005

Robert Dennard helped change the face of computer technology with dynamic random access memory (DRAM) in 1967. Created at IBM, DRAM’s denser memory cell storage on a single chip has enabled smaller, portable computers and is still the paragon in the industry today. Dennard also conceived the scaling theory, with colleagues, published in the 1974 paper—“Design of Ion-Implanted MOSFETs with Very Small Physical Dimensions.” Since its inception, it has been deemed the principal guide for designing submicron dimensional devices. He is the author of 35 patents.

Edith M. Flanigen, 2004

While working as a research chemist at Union Carbide, Edith Flanigen led a team that uncovered a new generation of synthetic molecular sieve zeolites. Used in chemical, petrochemical and petroleum refining industries, these industrial materials adsorb smaller molecules and prevent larger molecules from entering the sieve; many also help reduce energy and waste. Flanigen, who has amassed over 100 patents, also discovered the first practical way to manufacture zeolite Y, one of the most commonly produced molecular sieves used to make gasoline and jet fuel commercially feasible.

William P. Murphy, Jr., 2003

Combining a passion for mechanical engineering with his expertise in medicine, William P. Murphy, Jr. advanced the biomedical industry. Among his 17 patents (many co-developed) are: flexible sealed blood bags; an efficient hemodialyzer (artificial kidneys); motor-driven high-pressure angiography injectors; disposable medical trays; torque-controlled selective and disposable vascular diagnostic catheters; and the first physiologic cardiac pacemaker.

Ruth R. Benerito, 2002

In the post World War II era, Ruth Benerito salvaged the cotton industry with her invention of easy-care cotton. By using mono-basic acid chlorides instead of di-basic acid chlorides to crosslink cotton's cellulose chains, she produced the wrinkle-, stain- and flame-resistant fabric known as "wash and wear." Benerito garnered 55 patents throughout her career, and made vital contributions that helped transform the textile, wood and paper industries.

Raymond V. Damadian, 2001

Raymond Damadian's invention of the first full-body human magnetic resonance scanner changed the face of diagnostic medicine. In 1977, after seven years of arduous work, Damadian was able to produce the first scan of the human body. MRI (magnetic resonance imaging) scanners are

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used in hospitals and clinics to diagnose cancer, traumatic injuries, and other diseases and infections non-invasively. Damadian has since received 45 patents (some co-invented) for MRI innovations.

Al Gross, 2000

Al Gross (1918-2000), considered the founding father of wireless communications, brought the world such indispensable devices as the walkie-talkie, pager and cordless phone. During World War II, Gross's walkie-talkie invention led to the development of a two-way air-to-ground communications system used for wireless intelligence gathering. His discriminatory circuitry, which followed, enabled personal pocket paging systems, plus the cell phone and cordless phone.

Stephanie L. Kwolek, 1999

As a chemist at DuPont's Pioneering Lab, Stephanie Kwolek revolutionized the polymer industry in the 1960s when she developed Kevlar®, the high-strength, lightweight and heat-resistant fiber that is the life-saving material of bulletproof vests. Kwolek's 40-year devotion to research in chemistry also contributed to the development of Lycra®, Spandex®, Nomex® and Kapton®.

Jacob Rabinow, 1998

With 230 patents, inventor/engineer Jacob Rabinow's (1910-1999) inventions span many fields including ordnance, sound reproduction, photography, horology, reading machines, optical products and electronic systems. Among them are the automatic letter-sorting machine for the U.S. Postal Service; automatic regulation of clocks and watches; the magnetic particle clutch used in cars and airplanes; straight-line phonograph; pick-proof lock; and a magnetic memory device.

Gertrude B. Elion, 1997

With her colleague George Hitchings, Gertrude Elion (1918-1999) developed many breakthroughs in medicine such as drugs to treat leukemia, malaria, bacterial infections, and even suppress the immune system to enable organ transplants. During her 40-year career at Burroughs-Wellcome (now Glaxo-Wellcome), Elion received 45 patents and was a co-recipient of the 1988 Nobel Prize for Medicine.

Wilson Greatbatch, 1996

Wilson Greatbatch created the implantable cardiac pacemaker in the 1950s, the first major internal biomedical device in history. In 1970, he upgraded his device with a lithium iodine battery for durability. He holds 150 patents and has founded nine companies, including Greatbatch, Ltd, which still sells or licenses more than 90 percent of the world's pacemaker batteries. In 2002, Greatbatch co-invented an MRI-safe defibrillator and an MRI-compatible pacemaker.

William R. Hewlett and David Packard, 1995

Engineers William Hewlett (1913-2001) and David Packard (1912-1996) founded the Hewlett-Packard Company in 1939, where they developed some of the world's most successful measurement and computation products and systems. HP innovations include the cesium-beam standard clock, first scientific desktop calculator, mainframe computer, inkjet printer and laser printer.

Innovation At MIT

The Massachusetts Institute of Technology is one of the world's pre-eminent research universities, dedicated to advancing knowledge and educating students in science, technology, and other areas of scholarship that will best serve the nation and the world in the 21st century. It is known for its rigorous academic programs, cutting-edge research, a diverse campus community, and its longstanding commitment to working with the public and private sectors to bring new knowledge to bear on the world's great challenges.

Patents, License Agreements and Economic Contribution

- MIT has had over 1,500 issued U.S. patents in its portfolio and is one of the most active university patent and licensing offices in the country. In each of the past five years, MIT has had over 100 U.S. patents issued, and its Technology Licensing Office has signed 60 to 100 option and license agreements.
- Each year, more than \$750 million in sponsored research is conducted at Lincoln Lab, Whitehead Institute and on MIT's campus, leading to approximately 400 new inventions per year.
- MIT inventions add more than \$20 billion and 150,000 jobs to the economy each year.

Notable Research Achievements of the Past Century

- Creation of modern food preservation process
- First chemical synthesis of penicillin and Vitamin A
- Invention of magnetic core memory which made possible the development of the digital computer
- High-speed photography
- Development of the inertial guidance systems for the Apollo space program
- Development of modern technologies for artificial limbs
- Development of steel-making
- The space program, including the landing of humans on the moon

Notable Recent Achievements by MIT Research Teams and External Collaborations

- Developed a semi-conductor polymer that is able to detect the presence of TNT vapor even at the concentration of parts per billion
- Developed a gas that shows high-temperature superfluidity
- Used viruses to assemble nanomaterials exhibiting the specific chemical and electrical properties selected by the designer
- Created a compound that produces hydrogen the way plants do, through a process similar to photosynthesis
- Developed possibilities for cancer prevention treatments based on an understanding of the chemical makeup of cancer cells
- Developed a method of gene therapy that could correct sickle-cell disease
- Provided first-time measurements of the snow and frost on Mars, observing seasonal changes in the planet's atmosphere
- Located the gene responsible for myotonic dystrophy, the most frequent form of muscular dystrophy, and identified the nature of the mutation
- Fabricated a single-electron transistor
- Developed a new optical technique to measure galaxy distances with unprecedented accuracy and reliability
- Developed a microchip that releases different chemicals on demand from tiny reservoirs built into its structure; the microchip has many potential uses in medicine and other fields
- Created the first atom laser, a device analogous to an optical laser that emits atoms instead of light, with potential uses in fundamental research and industry

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Achievements of the MIT Community

- 62 current and past members of the MIT community have won the Nobel Prize—eight current faculty members are Nobel laureates
- 31 current, emeritus and past members of the MIT faculty have received National Medals of Science; one has received National Medals of Technology
- Four former members of the MIT faculty have received the Kyoto Prize
- Four current and former staff members have received the Japan Prize
- There are 20 MacArthur Fellows, 80 Guggenheim Fellows, and six Fulbright Scholars among current MIT faculty and staff

International Programs and Cooperation

- The Singapore-MIT Alliance (SMA) is pioneering an innovative approach to global engineering education and research. Founded in 1998, SMA utilizes advanced communications technologies in what may be the largest distance education collaboration in the world today.
- The World Wide Web Consortium (W3C) was founded at the MIT Laboratory for Computer Science in collaboration with the European Organization for Nuclear Research (CERN) in 1994. The mission of the W3C is to lead the World Wide Web to its full potential by developing protocols and guidelines that ensure long-term growth for the Web. Currently, it is an international consortium administered by the MIT Computer Science and Artificial Intelligence Laboratory (CSAIL), the European Research Consortium for Informatics and Mathematics (ERCIM), and Keio University in Japan.
- In a partnership, MIT, the Swiss Federal Institutes of Technology, and the University of Tokyo established the Alliance for Global Sustainability (AGS), joined by Chalmers University of Technology in 2001. AGS brings scientists, engineers, and social scientists together to address the emerging set of complex global environmental issues that profoundly affect social and economic progress.
- The MIT International Science and Technology Initiatives established regional programs in Japan (launched in 1981), China (1995), Germany (1996), India (1999), Italy (1999) and France (2000). The goals of these programs are to enlarge students' opportunities for international learning.
- In 1999, MIT and Cambridge University announced a partnership that would facilitate student and faculty exchange between the two universities, as well as collaborative research and curriculum development projects. While most exchanges usually involve only a few departments, the Cambridge-MIT Institute will engage faculty from all schools.
- MIT OpenCourseWare (OCW) debuted on the Web in 2001 to provide free, searchable, access to MIT's course materials for educators, students and self-learners around the world. OCW is a large-scale, Web-based publishing initiative funded by the William and Flora Hewlett Foundation, the Andrew W. Mellon Foundation and MIT.
- In 2002 the Deshpande Center for Technological Innovation was launched with an initial gift of \$20 million from Jaishree and Desh Deshpande to serve as a catalyst for innovation and entrepreneurship by supporting research and collaboration among entrepreneurs, young companies and MIT students, alumni and faculty. The Center is committed to bridging the innovation gap by nurturing marketable inventions, fueling market driven innovation, and implementing innovation in the marketplace.

MIT School of Engineering

MIT's School of Engineering serves to meet societal needs through education, research and public service through its objectives: to develop future leaders in industry, government and educational institutions, and to influence directions of engineering education and practice. Recognized as a premier academic institution in engineering, the School has distinguished itself as a leader in engineering education and in teaching applied, hands-on engineering. MIT's School of Engineering has created many new fields of engineering inquiry and has contributed to the betterment of humanity through numerous groundbreaking innovations of the 20th century. In 2006, *U.S. News and World Report* ranked MIT's School of Engineering #1 in the country. Comprising seven departments and two divisions, the School has pioneered a range of programs that partner with industry or other universities. In a world increasingly influenced by scientific and technological innovation, MIT's School of Engineering is uniquely poised to lead the next generation of engineering innovation.

THE LEMELSON FOUNDATION

improving lives through invention

Founded by Jerome Lemelson, one of U.S. history's most prolific inventors, **the Lemelson Foundation celebrates and supports inventors and entrepreneurs to strengthen social and economic life.**

The Foundation uses its resources to recognize and celebrate accomplished inventors, to mentor young people and support their scientific curiosity and innovative spirit, and to research and disseminate information and technologies that help people help themselves. To date the Foundation has donated or committed more than \$140 million in support of its mission in the U.S. and developing countries.

U.S. - Funded Programs & Initiatives

The Jerome and Dorothy Lemelson Center for the Study of Invention and Innovation at the Smithsonian Institution in Washington, D.C., has reached millions since 1995 through educational programs about the central role innovation plays in America, and through exhibitions and publications about inventions and inventors.

The National Collegiate Inventors and Innovators Alliance (NCIIA) is a network of more than 200 colleges and universities that support multidisciplinary inventing teams of students, faculty and industrial representatives known as "E-teams," for excellence and entrepreneurship. The NCIIA programs engage more than 5,000 students annually.

The Lemelson Center for Invention, Innovation and Entrepreneurship (LCIIE) at the University of Nevada, Reno, fosters curriculum development in invention, innovation and patent law.

The African-American Male Achievers Network, Inc. (A-MAN) encourages underserved children to develop skills in math, science and business through its programs in Los Angeles County and South Africa.

INNOVATIONS: TECHNOLOGY / GOVERNANCE / GLOBALIZATION, a quarterly journal published by MIT Press, analyzes best local practices in a global context, addressing the creative actions of social entrepreneurs, inventors, and public leaders who use technology to transform governance.

The Lemelson-MIT Program (L-MIT) recognizes inventors with the \$500,000 Lemelson-MIT Prize and other awards. Recipients include Leroy Hood, inventor of the DNA Sequencer, which facilitated the Human Genome Project. L-MIT also provides invention experiences for high school students nationwide through its InvenTeams program.

"I love doing this. I felt like I was in a real life situation as an engineer starting with nothing but an idea and ending up with that idea in your hands."

-Walter Myers,
Centennial High School
InvenTeam student

MIT's International Development Initiative (IDI) mentors MIT students to cultivate invention, innovation, and entrepreneurship in service of communities lacking access to products and services that meet basic human needs. Since 2003, more than 390 students have participated in IDI programs, and its projects have benefited thousands of people in developing regions.

The Lemelson Assistive Technology Development Center (LATDC) at Hampshire College in Massachusetts provides students with experiential education in applied design, invention and entrepreneurship with a focus on universal design and the development of adaptive equipment for people with disabilities.

The Cooper Hewitt National Design Museum in New York developed and exhibited *Design for the Other 90%* in 2007. The show highlights the importance of affordable and socially responsible objects that empower global populations surviving under the poverty level or recovering from a natural disaster. It will travel to locations in the U.S. and Canada.

The WGBH Education Foundation's NOVA production unit developed *Saved by the Sun*, a one-hour television program on solar energy with stories of innovators who are changing the way people think about energy.

Saturday Academy, a Portland-based educational outreach organization, is working with Lemelson-MIT to expand the InvenTeams program, providing hands-on invention experiences for high school students in Oregon.

Oregon MESA (Math, Engineering, Science, Achievement) provides students underrepresented in STEM fields with opportunities to develop their talents through hands-on, inquiry-based projects.

The Micro-enterprise Inventors Program of Oregon (MIPO) provides independent inventors access to resources, mentoring, training and networking to protect, market, and grow their inventions and intellectual property.

The Oregon Museum of Science and Industry's (OMSI) Innovation Station is filled with exhibits that engage visitors of all ages in the exploration of technology, giving them a better understanding of the value and relevance of invention.

International - Funded Programs & Initiatives

Technology Dissemination

Portfolio: The Foundation supports projects to promote the creation, manufacturing, distribution and adoption of appropriate technologies. These projects operate at various stages of product development, from the redesign of technologies through market development and expansion—all with the goal of getting life-improving products into the hands of poor people.

Current *Technology Dissemination* projects include:

KickStart, which develops agricultural products to help very poor entrepreneurs in East Africa start businesses, is creating three new or redesigned water pump products and establishing a technology development center in Kenya.

PATH (Program for Appropriate Technology in Health), is developing an improved women's condom to be marketed in developing countries as well as in the U.S. The product will give women the power to protect themselves from unwanted pregnancy and the risk of HIV and other infections.

The **Center for Rural Technology, Nepal** is adapting a proven technology to create a more affordable energy generator for households in rural Nepal.

Sevak Solutions is refining and scaling a "remote transaction system" to enable micro-finance institutions to extend banking services to rural clients in the developing world.

FUNCRAF is adapting a proven, low-cost hearing aid technology developed by Botswana-based Godisa. FUNCRAF will manufacture the product and distribute it, along with its solar rechargeable batteries, to the Brazilian market.

E+Co is undertaking a project to build a key link in the solar energy distribution chain – the rural retail network – by training and financing rural small enterprises to provide households with access to affordable and sustainable energy.

Emergence BioEnergy is initiating an off-grid energy project in Bangladesh to produce sustained energy for a community from biogas and stirling engines.

CAMBIA is developing and disseminating bio-sentinel rice varieties that will empower farmers to effectively detect soil nutrient deficiency or attacks by pests on crops. CAMBIA will share its results with the scientific community through its "open source" BioForge platform.

Envirofit International is installing its innovative direct-injection retrofit kits on 3,000 two-stroke motorcycle taxi engines in Vigan, Philippines — eliminating 3,000 tons per year of carbon dioxide and infusing the local economy with \$1.4 million in fuel cost savings.

IDEAAS is testing the feasibility of providing solar energy to rural poor people in the lower Amazon basin. The organization's solar kits—which households lease rather than purchase—are tailored to a customer's needs, expectations and current energy expenditures.

The Aquaya Institute is exploring the feasibility of affordable and flexible water disinfection technology. By coating water containers and filters with quaternary ammonium silanes (QASs) compounds, Aquaya hopes to improve water quality, sanitation and hygiene for low income consumers.

International Development Enterprises-India (IDE) is expanding its manufacturing, distribution and retail supply chains for its low cost drip irrigation kit throughout India. The Foundation is also providing funds to **IDE-USA** to replicate IDE-India's distribution model in Central America.

Sustainable Harvest Coffee Importers and **EcoLogic Finance** are introducing new coffee technologies to farmers in eastern Tanzania that will increase their incomes while encouraging protection of local biodiversity. The **Jane Goodall Institute** is developing an eco-label for the coffee originating from the region.

Schwab Foundation for Social Entrepreneurship partnered with The Lemelson Foundation to support the transfer and scaling-up of innovations between social entrepreneurs within their respective global networks.

SEWA Housing Trust & SELCO-India are partnering on a renewable energy project to adapt technologies to the needs of the poor and distribute them to households in Gujarat State, India.

Recognition and Mentoring Programs (RAMPs): The Foundation is teaming with institutions and organizations in developing countries to create RAMPs. These programs provide prototype development, marketing, and commercialization support to student and grassroots inventors who are working to advance the broad objectives of sustainable development.

- India RAMP: **Indian Institute of Technology (Madras)**, and **Rural Innovations Network**.

- Indonesia RAMP: **Institut Pertanian Bogor**.

- Peru RAMP: **Non-Profit Enterprise Self Sustainability Team**, the **International Potato Center - Consortium for Sustainable Development of the Andean Region**, and the **Catholic University of Peru's Rural Support Group**.

The Ashoka-Lemelson Fellowship Program: A global partnership to build a critical mass of 100 inventor-entrepreneurs and catalyze their growth and impact.

Ashoka-Lemelson Fellows are early- and advanced-stage inventor-entrepreneurs, primarily in Latin America, Asia, and Africa, whose innovations provide new solutions for solving the world's intractable problems. Fellows are provided with financial support, professional guidance, and access to a network spanning 70 countries.